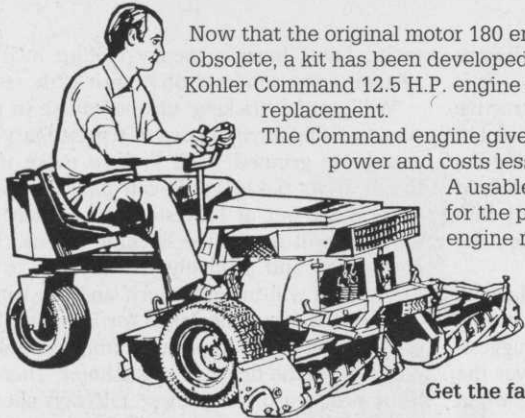


# REJUVENATE YOUR RANSOMES MOTOR 180 WITH A KOHLER COMMAND ENGINE



Now that the original motor 180 engine is obsolete, a kit has been developed to fit the Kohler Command 12.5 H.P. engine as a replacement.

The Command engine gives more power and costs less to run.

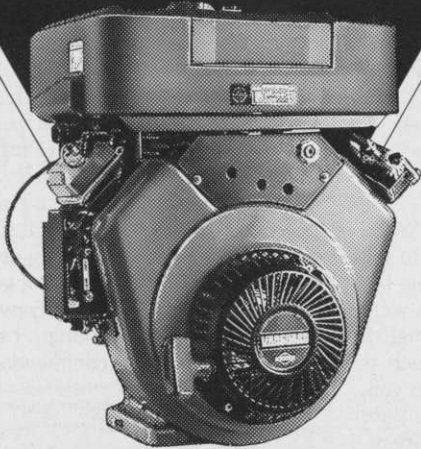
A usable machine for the price of an engine makes economic sense.

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## AT THE HEART OF A WINNING COMBINATION



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# ENGI

**P**etrol or diesel, which is best? Of course the answer depends on so many variables but probably the most important of all would be the type of equipment to be powered. A solidly built, heavy diesel engine could be suitable for the larger ride-on commercial mowers but is it right for equipment that travels over sensitive greens and other fine turf? Perhaps a lighter, quieter, vibration-free OHV petrol engine is a better alternative. The advantages of petrol over diesel can be summarised as follows: Typically a 12kw petrol engine will weigh only 32kgs, reducing the chances of equipment leaving ruts or compacting the surface. As the petrol engine tends to be more compact it allows equipment manufacturers to reduce the overall size and weight of the equipment.

**Low noise levels:** Comparing like for like a petrol engine will be quieter than an air cooled diesel so it is often necessary to build expensive enclosures to reduce noise levels from diesel engines to acceptable levels.

**Lower vibration:** Modern petrol engines such as Briggs & Stratton's Vanguard 16HP V-Twin have very low vibration giving high levels of operator comfort and minimising the need for a reinforced chassis and mounting plate.

**Better starting:** Especially in cold weather the petrol engine will normally start easier than the diesel due to its lower compression ratio and the higher volatility of the fuel.

**Fuel economy:** This is the area where the diesel usually has the biggest advantage but the latest OHV petrol engines are up to 30% more fuel efficient than the older side valve designs. And of course they can all run on unleaded fuel, which now costs about the same as diesel. The fuel consumption for a 12kw petrol engine running on a typical 50% load would be approximately three quarters of a gallon an hour.

**Lubrication:** Modern petrol engines now have pressure lubrication systems with external oil filters – just the same as their diesel cousins.

**The environment:** Improved carburettor design has resulted in lower emission levels and catalytic converters will soon be available for some engines. Most petrol engines can also be run on environmentally friendly LPG (Liquid Propane Gas).

Equipment manufacturers often offer a choice of engine allowing prospective purchasers to make the decision themselves on which type of power unit is most suitable for their operation.

**I**n recent years there have been many improvements in lightweight, high speed diesel engines which make them suitable for purposes for which they would not have been considered a few years ago. The diesel unit, because of its high compression ratio – often in the region of 20:1 – has to be a robustly constructed engine which in turn is one of the factors that leads to a long service life. Often they are now of a size that makes them interchangeable with an existing petrol engine which is fitted to an expensive piece of machinery.

**Diesel advantages:** Amongst the advantages of the diesel are a much lower combustion chamber temperature leading to far longer valve and piston ring life, less dilution of the oil on the cylinder bore during cold starting and a very much improved fuel consumption. If 'red' diesel is being used, fuel bills can be cut by as much as 75%. It is normal for a diesel engine to run for 1,500 hours before it needs decarbonising and the injector cleaned and reset and a further 1,500 hours before a rebore needs to be considered. As many engines are built to have two or three overhauls in their lives, a total life of 10,000 hours is not an unreasonable expectation. This, together with the outstanding fuel economy, will repay the extra first cost of a diesel engine many times over. The essential advantages of the diesel engine are: Robust construction, long engine life, good fuel economy and reliability.

# INES

Then the question is, can I get an engine to fit my machine? The answer is most probably yes, as engines are now available in a very wide range of configurations from single and twin cylinder air cooled units which can be obtained in horizontal or vertical crankshaft form through multi-cylinder water cooled units. Engines are available with drive from either or both ends of the crankshaft and with additional PTO's for hydraulic pumps. Starting can be by rope, recoil, hand crank or battery. Power ratings can be from about 5hp onwards with very good torque characteristics.

As much machinery used on golf courses is imported from America (where fuel is cheap) the use of high horsepower petrol engines goes by unnoticed. In the UK, however, petrol is very expensive, particularly in relation to gas oil or 'red' diesel, so much so that a diesel engine can more than pay for itself in fuel saving in less than a year. If these savings can be made on a long life engine for one piece of equipment, imagine the scale of economy when a whole fleet of golf course equipment is considered; and as every course manager and greenkeeper will know, cost is of paramount importance. All courses have tractors and therefore diesel fuel will be readily obtainable. Its extended use will reduce the quantity of highly inflammable petrol that needs to be stored at any one time.

Now that diesel engines are made to be more readily started, many of the small units can be as easy to start on the recoil as a petrol engine. The multicylinder indirect injection engines have heater plugs and many or all of the features found on modern automotive diesel engines to ensure that they are trouble-free cold starters.

The diesel no longer need be regarded with suspicion, for it can be easily started, is reliable, economical and has a very long service life. There is a type and configuration for nearly every job on a golf course. As we have already seen, engines can be bought from small air cooled single cylinder versions to multicylinder liquid cooled units with their own radiators. Now is the time of year to consider re-engining



that expensive equipment with a long life, low fuel consumption diesel engine.

■ Greenkeeper International acknowledges the assistance given in compiling this comparison feature from Briggs & Stratton (petrol) and Tecnamotor (diesel).

## Engine efficiency means less pollution

by HUGH TILLEY

Fuel economy was the prime goal for engine development a few years ago but now the goal posts are in front of lower emissions and pollution control – reflecting demand by customer, user and the general public. In particular the golf playing public is expecting mowers to be seen (but only if essential), but not heard nor smelt, (nor should they smoke or otherwise pollute the atmosphere). For the operator there are also health and safety hazards in noise and toxic and obnoxious emissions which have to be avoided. Development is also taking place in engine management systems which offer considerable scope for improvement in engine efficiency, the main factor restricting their introduction appearing to be cost and acceptability.

There is a clamour for bio-degradable and synthetic oils though this ideal has yet to match the reality. There has been rationalisation in the number of makes of small engine used in turf machinery, perhaps as smaller makers fall behind in R & D and marketing, and today is the day of the lightweight, high speed, compact diesel engine, especially for the professional who values the greater economy and reliability they offer – so

says one leading maker of such engines. Another manufacturer suggests that one gallon of diesel will do the work of three gallons of petrol, similarly he estimated the service life of a diesel to be twice or three times as long, perhaps 10,000 against 3/4,000 hours. This may be exaggerated as the latest petrol engines also have improved consumption and a longer service life. A number of American manufacturers have been a little tardy in adapting their machines to diesel – because 'gasoline' is cheap (in America). In the UK, diesel has many advantages and prime reasons for specifying it include the ease, safety, and convenience of storing. Considerations over whether to specify diesel or petrol must also look at annual running hours: some machines will never put in sufficient hours to justify the extra cost of a diesel engine. Significant advances have been made in petrol engines, and petrol is still the predominant fuel for pedestrian operated equipment, and because weight, simplicity and cost are usually important, most are air cooled. Much noise has been designed out by better balanced components and improved ignition chambers, and the trend is towards overhead valves which, while more complex and expensive, do

result in better ignition, – thus a cleaner, quieter burn and improved fuel efficiency.

Solid state or electronic ignition has made a dramatic improvement in both the reliability and performance of small petrol engines. Most people have also been converted to low octane unleaded fuel without real trouble. Many of these petrol engines now have automatic decompression systems which dramatically reduce the effort required to start them, this is particularly noticeable with recoil starters, but it also applies to key starting. Because the engine spins more readily so is it quicker to start -making 'first pull' starts more of a reality. The saving in broken cords and frustration can be quite real too.

Diesel engines are now available from about 5hp, and while they are more expensive than an equivalent petrol version they may now be very little heavier. Air cooled versions can be expected to be noisier than an equivalent liquid cooled version, but the deeper note of the diesel may be more acceptable than the more penetrating tone of an air cooled petrol engine.

The latest generation of diesels, particularly for ride-ons etc., are likely to be compact multi-cylinder water cooled designs, and these → 23